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FINANCIAL & STATUS REPORT

SEPTEMBER 1957

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TASK III

by

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I. FINANCIAL

Amount Authorized	\$5,000
Funds Expended (As of October 1, 1957)	4,086
Funds Committed	160
Funds Remaining	754

II. STATUS

Investigation of Remote Control Problem

The feasibility of using a 720 cps carrier voltage superimposed on a power line was established. A breadboard transmitter and coupling network were assembled to aid in the development of the receiver.

Three approaches to the problem of the frequency selective relay for the receiver were investigated. First was the use of a magnetic mercury switch actuated by an iron core coil resonated to 720 cps, such as is employed in off-peak water heater control switches. This relay has a sensitivity of 1 volt and is characterized by simplicity and high reliability at the expense of some fragility because of the glass enclosed mercury switch.

Another approach to the selective relay problem is the use of cold cathode thyratrons. These were investigated and the type JAN-395A chosen. The 395-A was chosen because of its small size, ruggedness and desirable electrical characteristics. A receiver was developed using the thyatron and a tuned L-C circuit as the frequency discriminating element. This receiver has a sensitivity of 0.8 volts and does require more components than the mercury switch receiver. However it is also more rugged, and by judicious choice of components the reliability can be made as high as that of the mercury switch.

For the third approach a mechanically resonant reed relay was investigated for use as the frequency discriminating element. Since this relay produces an intermittent type of contact when actuated, it must be used with an auxiliary power handling device. A receiver was developed using the resonant relay in conjunction with the 395-A thyatron. This receiver has a sensitivity of 0.5 volts and requires about the same number of components as when using an L-C tuned circuit. It also has comparable ruggedness and reliability.

Demonstration models of the mercury switch receiver and the thyatron L-C receiver have been built. Performance of the thyatron receiver has been explored on various

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power circuits in the laboratory. Some further work on the propagation of the signal in various types of circuits will be carried out and a report prepared.

Summary of Status to Date

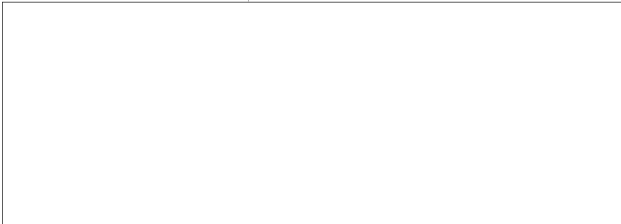
The preliminary study made as Part 1 of the program outlined in the original proposal resulted in sufficient information on available techniques to make possible the selection of three approaches, all of considerable promise. Under Part 2 of the program an intensive though brief development program brought two types of frequency selective elements to the point where demonstration samples of excellent performance could be constructed.

Two different complete receiving units have been built, each consisting of a frequency selective, sensitive, passive relay actuating a power relay through a thermistor bridge to obtain immunity to transients as well as a positive self synchronizing operational sequence. These receiver units are of very small size and high reliability.

A breadboard transmitter made up of available components has been used for tests.

Some limited tests to determine propagation characteristics and operational range to be expected indicate that useful ranges can be obtained.

A report is being prepared covering the work done, results achieved, and recommendations for further work required to bring this equipment to the prototype stage.


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